

CLAIMS

1. An amino acid wherein the sidechain of said amino
5 acid is isotopically enriched with ^2H and wherein the
backbone of said amino acid is isotopically enriched with
an isotope selected from the group consisting of ^{13}C , ^{15}N ,
 ^2H and any combination thereof, with the proviso that
said amino acid is not isotopically enriched with ^2H at
10 every hydrogen.
2. An amino acid of claim 1, wherein the backbone of
said amino acid is isotopically enriched with an isotope
selected from the group consisting of ^{13}C , ^{15}N , ^2H and any
15 combination thereof.
3. An amino acid of claim 1, wherein the α -carbon proton
of said amino acid is isotopically enriched with ^2H .
4. A method of synthesizing the amino acid of claim 1,
20 which comprises:
- (a) obtaining glycine that optionally is
isotopically enriched in the backbone with an isotope
selected from the group consisting of ^{13}C , ^{15}N and ^2H or
25 any combination thereof;
 - (b) chemically derivatizing said glycine;
 - (c) adding a deuterated side chain to said
chemically derivatized glycine in a stereo-selective
manner to produce a protected sidechain deuterated amino
30 acid; and
 - (d) deprotecting said sidechain deuterated amino
acid.

5. A method of synthesizing the amino acid of claim 2, which comprises:

(a) obtaining glycine that optionally is isotopically enriched in the backbone with an isotope selected from the group consisting of ^{13}C , ^{15}N and ^2H or any combination thereof;

(b) chemically derivatizing said glycine;

(c) adding a deuterated side chain to said chemically derivatized glycine in a stereo-selective manner to produce a protected sidechain deuterated amino acid;

(d) deuterating the α -carbon of said protected sidechain deuterated amino acid; and

(e) deprotecting said sidechain deuterated amino acid.

6. A peptidic molecule which comprises at least one amino acid of claim 1.

7. A peptide molecule which comprises at least one amino acid of claim 2.

8. A peptide molecule which comprises at least one amino acid of claim 3.

9. A peptide molecule which comprises at least one species of amino acid wherein the side chain of each occurrence of said species of amino acid is isotopically enriched with ^2H .

10. A peptide molecule of claim 9, wherein the backbone of each occurrence of said species of amino acid is isotopically enriched with an isotope selected from the

group consisting of ^{13}C , ^{15}N , ^2H and any combination thereof.

5 11. A peptide molecule of claim 9, wherein the α -carbon proton of each occurrence of said species of amino acid is isotopically enriched with ^2H .

10 12. A medium capable of supporting the growth of cells in culture which comprises at least one amino acid of claim 1.

15 13. A medium capable of supporting the growth of cells in culture which comprises at least one amino acid of claim 2.

14. A medium capable of supporting the growth of cells in culture which comprises at least one amino acid of claim 3.

20 15. A method of producing an isotopically labeled peptide molecule, which comprises:

(a) providing a medium of claim 12;

(b) providing a cell culture that expresses said peptide molecule;

25 (c) growing said cell culture in said medium under protein-producing conditions such that said cell expresses said peptide molecule in isotopically labeled form; and

30 (d) isolating said isotopically labeled peptide molecule from said medium.

16. A method of producing an isotopically labeled peptide molecule, which comprises:

- (a) providing a medium of claim 13;
- (b) providing a cell culture that expresses said peptide molecule;
- (c) growing said cell culture in said medium under protein-producing conditions such that said cell expresses said peptide molecule in isotopically labeled form; and
- (d) isolating said isotopically labeled peptide molecule from said medium.

17. A method of producing an isotopically labeled peptide molecule, which comprises:

- (a) providing a medium of claim 14;
- (b) providing a cell culture that expresses said peptide molecule;
- (c) growing said cell culture in said medium under protein-producing conditions such that said cell expresses said peptide molecule in isotopically labeled form; and
- (d) isolating said isotopically labeled peptide molecule from said medium.

18. A method of determining structural information for a peptidic molecule, which comprises:

- (a) producing said peptidic molecule according to the method of claim 15; and
- (b) subjecting said peptidic molecule to nuclear magnetic resonance.

19. A method of determining structural information for a peptidic molecule, which comprises:

- (a) producing said peptidic molecule according to the method of claim 16; and

(b) subjecting said peptidic molecule to nuclear magnetic resonance.

20. A method of determining structural information for a
5 peptidic molecule, which comprises:

(a) producing said peptidic molecule according to the method of claim 17; and

(b) subjecting said peptidic molecule to nuclear magnetic resonance.

10